DEPARTMENT OF EMPLOYMENT AND PRODUCTIVITY

Wool Textile Industry

Developments in Safety, Health and Welfare 1948 - 1968

Report of the Joint Standing Committee on Health, Safety and Welfare in the Wool Textile Industry

27 MY 1970

LONDON
HER MAJESTY'S STATIONERY OFFICE
1970

SBN11 360080 1

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Members of Joint Standing Committee on Health, Safety and Welfare
Appointed by the Minister of Labour on 26th April 1967

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J. A. Davis	HM Superintending Inspector of Factories for the Yorkshire and Humberside (Leeds) Division (*Chairman*)
J. J. T. Davey	HM Inspector of Factories (*Secretary*)

*Resigned 11th December 1968.
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Madam,

FOREWORD

1. In March 1945 Sir Wilfrid Garrett, then HM Chief Inspector of Factories, approached the Wool (and Allied) Textile Employers' Council, the Scottish Woollen Trade Employers' Association, and the National Association of Unions in the Textile Trade and invited them to nominate members for a Joint Advisory Committee which he proposed to set up to consider practical methods to improve conditions of work in the Wool Textile Industry. His invitation was accepted and the Committee, consisting of eight members nominated by each side of industry, seven HM Inspectors of Factories, and representatives of the Wool Industries Research Association, was constituted.

2. The terms of reference were as follows:

> "To enquire into and report on the most effective methods of compliance with certain requirements of the Factories Act 1937, and other related problems in the Wool Textile Industry as follows:

(a) Maintenance of a better standard of cleanliness and decoration in the mills.

(b) Ventilation, temperature and general atmospheric condition in workrooms, with particular reference to securing and maintaining a reasonable temperature in certain processes.

(c) Lighting.

(d) Fencing of machinery, including revision of the 1936 Agreement and necessary additions, amendments and deletions consequent thereon.

(e) Arrangement and spacing of machinery to ensure adequate safety and welfare conditions.

(f) Training of Young Persons on machines.

(g) Provision of Welfare Amenities (including sanitary accommodation, washing facilities and clothing accommodation): Medical and Welfare Services."

3. The Committee held 39 meetings and paid 17 visits to mills to see existing conditions. Specialist members of the Factory Department attended certain meetings to give the Committee the benefit of their expert advice on particular aspects of its work.

4. At the inaugural meeting on 21st June 1945, it was decided to give priority to consideration of the spacing of machinery as this appeared to be a matter of great urgency in view of the number of firms who were proposing extensive re-equipment or re-organisation of their mills. It was thought desirable that the Committee's conclusions should be made known as early as possible and two Interim Reports were prepared. The first dealing with processes subsequent to carding was signed on the 6th November 1946, and published during 1947; the second dealing with carding machinery was signed on the 19th June 1947, but was not published separately.

5. The Final Report, incorporating, with amendments, the two Interim Reports on Spacing was signed on the 18th February 1948, and published during the following year. In accordance with the Committee's wishes, a copy was sent to every known firm in the Wool Textile Industry.

6. In the Report, which runs to 58 pages, the various matters set out in the terms of reference are considered in detail. This was all the more necessary because of the varied and sectionalised nature of the industry, particularly on the worsted side. Some of the factors which were taken into account at that time were the result of changes brought about by the war, but others were inherent in an industry which had led the way in the Industrial Revolution and consequently suffered from old buildings, and to a large extent, old machinery and plant.

7. Among the major Recommendations in the 1948 Report was the proposal that a Joint Standing Committee should be established whose main functions should be

(a) to watch the progress made in implementing the Recommendations and to advise on any difficulties which might arise especially in connection with spacing of machinery;

(b) to consider certain aspects of the fencing of machinery after special enquiry had been made into them, and

(c) to review at intervals the accidents occurring in the industry.

HM Chief Inspector of Factories accepted these suggestions and on the 19th July 1949, the Committee, consisting of six members from each side of industry met in Bradford under the Chairmanship of the Superintending Inspector of Factories from Leeds, and it continued to meet at regular six-monthly intervals until in 1967 it was replaced by the existing Committee appointed by the Minister of Labour, Mr. R. J. Gunter.

8. The new Committee at its inaugural meeting considered its terms of reference and decided that if it wished to make any impact on the Wool Textile Industry it must make its existence and the work it was doing better known. Among its functions was to watch the progress in the implementation of the Recommendations contained in the 1948 Report, but such progress as was still taking place was not the result of any conscious effort to comply with the Recommendations because the Report had been out of print for several years and in consequence was virtually forgotten. Re-examination of the Report convinced the Committee that the majority of the Recommendations, having been couched in sound general terms by persons of great experience, were still relevant despite all the changes that had taken place. Three courses were open:

(a) To reprint the Report;

(b) To undertake a major revision, or

(c) To reproduce a summary of the Recommendations, together with a review of the developments of the last twenty years.

The latter course was adopted and the present publication is the result. The Committee earnestly hope that all occupiers and other persons interested will study this document and find in it something useful; that it will give in conjunction with the valuable work of the Training Board and the proposed new factory legislation, a fresh impetus to the improvement of working conditions and thus to the efficiency and prosperity of this vitally important Wool Textile Industry.

CHAPTER I

REPORT OF THE WOOL TEXTILE INDUSTRY JOINT FACTORY ADVISORY COMMITTEE 1948

SUMMARY OF RECOMMENDATIONS

9. A summary of the principal recommendations contained in para 140 of the final report of the Wool Textile Industry Joint Factory Advisory Committee signed in 1948 is given below:

9.1 Cleanliness and decoration

Oil trays should be provided under machines unless other effective steps are taken to prevent oil leaking on to the floors.

Accumulations of dirt, grease and fibre should be removed from floors and effective methods adopted for the maintenance of cleanliness.

Workrooms should be decorated in suitable colours and consideration should be given to the complementary painting of machinery.

9.2 Temperature and ventilation

(a) *Low temperatures*

Where general heating of woolsorting rooms is impracticable, local heating devices should be provided at the sorting positions, which should also be screened from draughts.

Any means adopted for softening press packed wool should be such as not to interfere with the adequate heating of sorting rooms.

Local heating devices should be provided near wool willeying machines.

The means of heating weaving departments should be put into operation well before the beginning of the working day and a temperature of at least 55°F should be maintained after the first hour of work.

Temperatures of at least 60°F during the first hour of work and at least 65°F thereafter should be maintained in burling and mending rooms.

(b) *Temperature and ventilation in woolcombing factories*

It should be the aim of employers to ensure that the temperature of any workroom does not exceed 85°F or 15°F above the outside temperature, whichever is the greater, and that the wet bulb temperature does not exceed 70°F.

Effective measures should be taken to reduce the amount of heat liberated from the plant into the air of the workrooms, in particular:

The casings of wool drying machines should be insulated as far as practicable. A proportion of the hot moist air from the driers should be discharged outside the workrooms.

Cool air should be used to blow wool from the wash-house to the card room and roof extractor fans should be installed above the driers where necessary.

All steam pipes (other than those used exclusively for space heating) should be insulated.

Wool should be as dry as is consistent with the efficient carding before delivery to the carding machines.

The casings of backwash driers should be insulated. Broken panes of glass in inspection doors should be replaced without delay and a proportion of the hot moist air should be discharged outside the workrooms.

Combs should be operated at the minimum temperature required by the process.

The roofs of wool carding and combing sheds should be whitewashed during the summer months.

Attention is drawn to the advantages of (a) generous spacing of steam heated machines and (b) individual steam traps as contributory factors in securing reasonable temperatures.

A high standard of general ventilation should be secured by the installation of plenum systems or other effective means; competent heating and ventilating engineers should be consulted.

(c) *Ventilation*

Where adequate ventilation of worsted spinning departments cannot be maintained by natural means owing to the need for protecting yarns from dirt, plenum ventilating systems incorporating air cleaning units should be provided.

Hopper type windows or baffled ventilators should be used where necessary to prevent draughts.

The air of rag grinding rooms should be kept free from oil fumes.

9.3 Lighting

Suggestions are put forward for intensities of general illumination in certain specified processes where good lighting is particularly important.

Glare should be avoided in all processes, by the use of properly designed shades or "low brightness" light sources. Where necessary, visors of diffusing glass should be provided.

A good system of general lighting should be provided, supplemented as necessary by local lights.

Where firms generate their own electricity for lighting purposes, adequate pilot lighting should also be provided.

Attention is drawn to the importance of good natural lighting; the cleaning of windows should be facilitated by the fitting of suitable frames.

9.4 Fencing and other safety precautions applicable to all machines

(a) *New machinery*

Machinery makers should pay more attention to their obligations under section 17 of the Factories Act 1937, which include the provision on new machinery of guards completely encasing any gearing.

The use of interlocking devices for guards should be extended.

(b) *Shafting*

Attention is drawn to the illegality and danger of approaching unfenced transmission machinery while it is in motion. Suggestions are made for fencing and for avoiding approach to unfenced shafting.

Efficient belt hangers or perches should be provided.

(c) *Belts and pulleys*

Methods of carrying out the necessary fencing of belts and pulleys are described.

Belts should be periodically inspected by experienced persons and kept in proper repair.

(d) *Projections on revolving parts*

These should be so sunk, encased, or otherwise effectively guarded as to prevent danger.

(e) *Toothed, chain and friction gearing*

In providing guards for the gearing of existing machines complete enclosure, as required for new machinery, should be the aim. If fender guards are provided, they should be so designed as to render the gearing inaccessible. Guards should be of substantial construction and fastened securely in position.

(f) *Maintenance of fencing*

In order to ensure that guards are kept in position at all times while the machines are running, guards should be carefully designed so that they do not impede the operative's normal work. Arrangements for lubrication should be such that any oiling which is necessary while the machinery is in motion and preferably any other oiling, can be done without the removal of guards. Interlocking arrangements should be provided for guards wherever reasonably practicable.

(g) *Accidental starting of machines*

Looms, mules, and gill boxes should be provided with locking devices to prevent accidental starting.

Where more than one person is working at a machine, only the person in charge of the machine should be allowed to start it, having first ensured that no other person is in danger.

(h) *Cleaning of machinery*

Special attention is drawn to the prohibition, contained in section 20 of the Factories Act 1937, of any woman or young person carrying out any cleaning of machinery which would expose them to risk of injury from moving parts of machinery. Any such cleaning which must be done while the machines are in motion should be carried out only by experienced men authorised by the management.

(i) *Lifting machinery*

Slings appropriate to every type of load concerned should be provided, and workers should be properly trained in their use; books should be maintained in good condition.

9.5 Special dangers associated with certain machines

A Technical Committee, consisting of members of the factory department should be set up to enquire into methods of fencing and other safeguards for dangerous parts of certain machines, and methods of complying with section 17. This Committee should work in consultation with the machinery makers and should report to the Joint Standing Committee.

9.6 Accident prevention

Some organisation or individual in every factory should be specially concerned to educate workers in good and safe methods of work, to review accidents and to watch for and guard against dangerous practices. In the larger factories, Accident Prevention Committees should be set up with members drawn from all sections and levels of the factory organisation.

Films are regarded as a valuable medium for safety education.

The Joint Standing Committee should meet twice yearly to review accidents occurring in the industry.

9.7 Lifting and carrying of heavy weights

The use of mechanical devices for lifting and moving weights should be greatly extended.

The existing regulations for the lifting of heavy weights should be extended to cover carrying and the maximum loads specified in the schedule to the regulations should be amended as shown.

9.8 The 1936 agreement

The clauses of this agreement are reviewed in detail. Some are incorporated in this report and others are noted for reference to the proposed Technical Committee. It is suggested that the continuance of the agreement would no longer serve any useful purpose.

9.9 Spacing of machinery

Detailed suggestions are made as to the minimum spaces which should be allowed around and between certain classes of machine when (a) new buildings are equipped, and (b) machinery is voluntarily re-organised in existing buildings. Proposals are also made concerning existing machinery where re-organisation is not contemplated.

9.10 Training of young persons on machines

Suitable persons should be nominated by the management to act as instructors, who should be responsible for training young persons and other new entrants in safe methods of work and safety precautions generally. Training schools should be set up in the larger mills and the training, whether carried out in a works school or in the workrooms, should include an adequate period of work under the supervision of the instructor. Recommendations are made for subjects to be included in the syllabus.

Carding machines and gill boxes should be prescribed by the Minister as dangerous machines for the purposes of section 21 of the Factories Act 1937.

9.11 Provision of Welfare Amenities

(a) *Sanitary accommodation*

All sanitary conveniences should be individually flushed water closets (except urinal accommodation which should be provided with suitable flushing arrangements).

Compartments should be of adequate size. Suggestions are made for the siting of conveniences in new buildings.

Adequate means should be provided in the sanitary accommodation to prevent freezing of the water system.

Arrangements should be made for the supply of toilet paper, and in the accommodation used by females for the supply and disposal of sanitary towels.

Interior walls and floors of conveniences should have a smooth, impervious surface. A responsible person, nominated for the purpose, should supervise the cleaning of conveniences.

(b) *Washing accommodation*

Wash-basins should generally be provided to a standard of one basin (or 2 ft. of trough) for every 15 workers employed, but in certain specified processes, one basin should be provided for every 10 workers.

Washing facilities should be conveniently accessible and constantly available; suggestions are made as to the most suitable positions for them.

Hot or warm water should be laid on. The wall at the wash-basins should have a smooth impervious surface, and a responsible nominated person should supervise the cleaning of the facilities.

Consideration should be given to the provision of spray baths, with proper accommodation for changing clothes, for the use of those employed in particularly dirty processes.

(c) *Clothing accommodation*

Individual metal clothes lockers, properly ventilated and with adequate arrangements for drying the clothing when wet, or other equally suitable accommodation should be provided for all workers.

(d) *Seats*

Suitable seats should be provided for all workers, male and female, whose work is done standing. A booklet in the Health and Safety at Work Series on Seats for Workers in Factories, Offices and Shops is being prepared and should be consulted when available. Careful consideration should be given to the design of seats for jobs which are done sitting; these should have back rests and be properly adjusted.

9.12 Medical and Welfare Services

(a) *Medical services*

A suitable room should be set aside in every factory for first-aid treatment, and records kept of the treatment which should be carried out by responsible persons having at least a St. John's Ambulance Certificate or equivalent training.

Where women or girls are employed, a rest room adjoining the first-aid room or, in the case of small factories, suitable alternative accommodation should be provided.

Special precautions, which are described in detail, should be taken to prevent dermatitis. The voluntary notification of cases of dermatitis is urged.

(b) *Welfare supervision*

A responsible person should be placed in charge of the welfare amenities; at the larger factories the appointment of a full-time welfare supervisor is thought desirable.

(c) *Canteens and feeding facilities*

Canteens where meals can be obtained on both day and night shifts, should be provided wherever possible.

In every factory where canteen facilities are not available on the premises, there should be a messroom with adequate facilities for warming food, boiling water, making tea and washing up.

The canteen or messroom should be adequately lighted, ventilated, warmed, furnished with tables and chairs and kept in a clean condition.

A committee representing both the management and the workpeople using the canteen, should be formed.

Where suitable facilities for taking food are provided, workpeople should not be allowed to eat in the workrooms. If this recommendation is not found successful in practice, consideration should be given to the extension by regulations of the provisions of section 48 of the Factories Act 1937, to certain processes.

9.13 Joint Standing Committee

A Joint Standing Committee should be set up to watch the progress made in implementing our recommendations and to advise on any difficulties which may arise, particularly in connection with spacing of machinery; to consider certain aspects of the fencing of machinery after special enquiry has been made into them; and to review at intervals the accidents occurring in the industry.

CHAPTER II

1948-1968 — A PERIOD OF CHANGE

10 Changes in the law

Since 1948 there have been considerable changes in legal requirements. The Factories Acts 1948 and 1959 amended and extended the law. Both of these Acts have now been consolidated with the Factories Act 1937, into the Factories Act 1961. There has also been a steady stream of statutory orders and regulations. The effect of all these on the implementation of the Recommendations set out in the previous Chapter at Para. 9 are considered below.

(a) *Lifting of heavy weights* (*Chap. I. para.* 9.7)

The Woollen and Worsted Textiles (Lifting of Heavy Weights) Regulations 1926, have not been amended as recommended in the report, either to cover "carrying" and "moving" or in respect of amended maximum weights. However, section 72 of the Factories Act 1961, now prohibits all persons employed from lifting, carrying or moving any load so heavy as to be likely to cause injury to him. Formerly this section only applied to young persons.

(b) *Training of young persons at dangerous machines* (*Chap. I. para.* 9.10)

This recommended that carding machines and gill boxes used in the wool textile trade should be prescribed by the Minister as dangerous machines for the purposes of section 21 of the Factories Act 1937. These machines have now been so prescribed by the Dangerous Machines (Training of Young Persons) Order 1954.

(c) *Washing accommodation* (*Chap. I. para.* 9.11(b))

This recommended that hot or warm water should be laid on to all wash-basins and should be constantly available. Section 58 of the Factories Act 1961, requires that adequate and suitable facilities for washing must be provided and maintained for the use of persons employed and that these must include a supply of clean running hot and cold, or warm water. Formerly there was no specific requirement for the provision of running hot or warm water.

(d) *Seating facilities* (*Chap. I. para.* 9.11 (d))

Here the report recommended that the section of the Factories Act dealing with seating facilities should be extended to require seats to be provided for male as well as female workers and drew attention to the need for careful consideration to the proper design of seats for jobs such as hurling and mending. Section 60 of the Factories Act 1961, requires that where any employed persons have in the course of their employment reasonable opportunities for sitting without detriment to their work, there should be provided and maintained for their use, suitable facilities for sitting, sufficient to enable them to take advantage of those opportunities. The section further requires that where a substantial proportion of any work can be done sitting, then seats of design, construction and dimensions suitable for the employed persons, must be provided and maintained, together with a foot-rest.

(e) *Standard of training of firstaiders* (*Chap. I. para.* 9.12 (a))

The report recommended that first-aid treatment in all factories, whether employing over 50 persons or not, should be carried out by a responsible person having at least a St. John's Ambulance Certificate or equivalent training. This part of the recommendation has not been embodied in legislation, but the second part, drawing attention to the need to have the standard of training maintained by attendance at refresher courses, has been implemented and a legal standard of training has been set down. This is covered by section 61 of the Factories Act 1961, and the First-Aid (Standard of Training) Order 1963, but the Order still only applies to factories employing more than 50 persons.

The following changes in the law are also relevant:

(f) *Means for fighting fire*

Section 51 of the Factories Act 1961, requires that in every factory there should be provided and maintained appropriate means for fighting fire which shall be so placed as to be readily available for use. This is the first time that means of fighting fire have been required in all factories.

(g) *Regular examination of fire alarms*

Section 52 of the Factories Act 1961, requires that every means for giving warning in case of fire required to be provided under the Act shall be tested or examined at least once in every period of three months, and a record of the date of every test or examination carried out must be entered into or attached to the General Register, giving particulars of any defect found and action taken to remedy such a defect. This, again, is a new requirement.

(h) *Notification of occupancy of a factory*

Section 137 of the Factories Act 1961, requires every person who begins to occupy or to use any premises as a factory to serve written notice of the intention upon the District Inspector not less than one month before commencement of occupation or use of the premises. This enables HM Inspector of Factories to see the premises before occupation or use. The Inspector also has power under section 55 of the Factories Act 1961, to apply for a Court Order to prohibit the carrying on of any process or work in premises intended to be used as a factory, if the premises are in such condition, or so constructed or placed, that any process or work carried on therein, or intended to be carried on therein, cannot be so carried on with due regard to the safety, health and welfare of persons employed.

(i) *Repeal of exemption relating to decoration of dyehouse walls*

The walls of dyehouses are no longer exempt from the usual statutory redecoration required under section 1(3) of the Factories Act 1961, unless they have a smooth impervious surface. Only the ceilings or tops of rooms in dyeworks, being rooms in which steam is evolved in the process, are now exempt from the requirement. If they are not kept clean, the Inspector for the district has power to require statutory redecoration to be carried out. Formerly, under the Factories (Cleanliness of Walls and Ceilings) Order 1938, walls of dyehouses were exempted.

11 Economic changes

One of the main developments in the industry, more especially on the worsted side, has been the increasing tendency towards amalgamations and regroupings with the consequent disappearance of a considerable number of family businesses. These amalgamations have led to reorganisation and rationalisation involving heavy capital investment in new machinery, although the wool textile industry has never attracted financial interest as much as the newer industries, e.g. electronics.

In order to exploit the new machinery to the full, increased hours have had to be worked. In some mills this has led to the introduction of the 3×8 hours shift system for men, in others women alternate on the two day shifts, with men permanently on nights. The most popular system however is still regular day working, with men operating in certain departments at night. Almost everywhere, evening shifts of women work between 5.0 pm and 10.0 pm with occasional Saturday mornings from 8.0 am to 12.0 midday.

12 Social changes – the immigrants

Since the war there have been many waves of overseas workers which have been attracted to the wool textile industry. In the 1950's Italian, Spanish and other European voluntary workers came for a period; many to settle permanently, but the majority to return to their homes after they had made sufficient money or because a temporary recession had made them redundant.

In recent years there has been a very substantial influx of immigrant workers, particularly from India and Pakistan, into the wool textile industry. It is fair to say that the night shifts at most mills could not continue to function without immigrant labour and the industry would be seriously undermanned during the day-time if such labour were not available. Unfortunately, many immigrant workers have been injured, often early in their careers in the textile mills; and accidents to them appear to be particularly common on night shifts, when standards of supervision may not be so high as during the day. The large scale employment of immigrant labour poses safety problems because these workers are usually unfamiliar with the factory environment, with the machinery and processes, and above all, with the English language. Considerable numbers of these workers are not literate in their own languages so that even where instructions and notices are posted in their own tongue, they cannot read them. There is no doubt that much more needs to be done in training immigrant workers to appreciate the hazards of an industrial environment, particularly the dangers associated with machinery, and in safe methods of working, if there is to be a real prospect of reducing the number of accidents to these workers.

13 Technical changes

(a) *Advent of synthetic fibres*

The past 20 years has seen the widespread introduction of manmade fibres into the wool textile industry. The use of these new synthetic fibres has necessitated development of specialised machinery, in particular tow-converting machines, which in their various forms have posed a number of difficult guarding problems. Several of the manmade fibres, i.e. the viscose rayons, are highly flammable and their presence substantially increases the fire risk in mills and warehouses.

On the preparation side, the availability of manmade fibres has made a growing impact on the trades associated with the recovery of woollen goods and waste materials and many of the small sorting and rag-grinding firms have now gone out of business.

(b) *From steam to electricity*

One of the major technical developments during the past 20 years has been the replacing of the mill engine with mains electricity as the source of power. Concurrently, the group drive has in many cases been replaced by the individual electric motor. This has meant the gradual decline in the use of overhead shafting and the virtual extinction of the engine room.

(c) *Mechanisation*

Although the wool textile industry was among the first to be highly mechanised during the nineteenth century the post-war years have seen a further advance, particularly in the conveyance of materials by pneumatic or mechanical means and in the introduction of programmed machinery whereby a whole series of linked processes can be set in sequential operation from a single control console.

(d) *Spinning developments*

On the worsted and combing side developments have taken place with the advent of the autoleveller and the high-draft systems. In wool, particularly on carpet yarn production, the ring frame continues to supplant the spinning mule, although the latter will not be ousted from the industry within the foreseeable future. Carding sets have remained relatively unchanged, although there are signs that a new generation of wider, faster carding sets for both wool and worsted are becoming available.

(e) *Weaving developments*

On the weaving side, although precise figures are not available, it is known that the majority of firms have re-equipped. With the installation of higher speed looms, re-spacing has become a viable proposition as well as a safety and amenity measure. The trend has naturally been towards the installation of automatic looms. Recently various types of shuttleless weaving machines have been introduced, raising hopes that the problem of the flying shuttle will thus be solved. The popularity of knitted as opposed to woven suiting fabrics and the consequent re-equipping of weaving sheds in the West Riding with knitting machinery is a move in the same direction.

14 Training

Since 1945 the Wool (and Allied) Textile Employers' Council through its Recruitment, Education and Training Department, and the Joint Recruiting and Training Committee on which both employers and unions are represented, has led the way in organising training courses. Although these are primarily aimed at increasing productivity, training in safety matters is recognised as being an integral part of each course.

When the Industrial Training Act 1964 came into force the wool textile industry was again in the forefront in setting up the first training board. Today, although the Recruitment and Training Department no longer exists, the Wool (and Allied) Textile Employers' Council still maintains its Management Services Centre in Toller Lane, Bradford. HM Inspectors of Factories regularly attend to give lectures on safety matters to the appropriate courses.

CHAPTER III

PROGRESS IN IMPROVING ENVIRONMENTAL CONDITIONS AND WELFARE AMENITIES

INTRODUCTION

15 One of the objects of the 1948 Report was to advise occupiers on how best to comply with the requirements of the Factories Act 1937. This was particularly necessary in view of the difficulties of applying new legislation to an industry that had been mechanised since the early nineteenth century and which had suffered in common with other consumer industries from the deprivations of the second world war.

It is not easy for many reasons to measure the extent of the progress made since 1948. First, there is no reliable information on conditions as they existed in 1948 and secondly, there is no individual who is familiar with the whole of this highly sectionalised industry.

16 1968 Survey of 381 wool textile factories

To try to provide something a little more reliable than the subjective observations of individual members of the Committee, HM Superintending Inspector of Factories arranged for Factory Inspectors in the West Riding, in the course of their normal duties, to complete a questionnaire giving positive information on some 25 per cent of the wool textile factories.

17 The visits were paid in the first eight months of 1968 and this and the following chapter rely heavily on the information obtained.

18 It is appreciated that the results are open to question in that they were not gleaned from a carefully selected sample of factories, e.g. with a proportion of factories in each size group or in each process.

19 Also it was often difficult for inspectors to assess whether a factory should be in one or other category when it consisted of many departments each of which might vary in its standard of cleanliness, lighting, heating etc.

TABLE I—NUMBER OF FACTORIES AND EMPLOYEES IN THE MAIN PROCESSES

Process	No. of factories	Nos. employed
Preparation – sorting, willeying, rag grinding	120	2,049
Worsted combing and spinning	68	8,577
Worsted weaving and finishing	40	4,458
Woollen manufacture	76	9,482
Miscellaneous	77	1,446
Total	381	26,012

20 According to the Wool Industry Bureau of Statistics 115,981 persons were employed on production on the 30th December 1967, so that the figure of 26,012 represents roughly about a quarter of those thus employed in the West Riding, but the numbers employed in the five separate categories are not in any way in proportion to the national figures.

TABLE II—CLEANLINESS

	Rating	Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
A Walls and ceilings	Good	37	43	24	43	39	186
	Satisfactory	48	14	8	12	28	110
	Unsatisfactory	35	11	8	21	10	85
B Floors	Good	28	31	16	19	32	126
	Satisfactory	75	35	22	44	44	220
	Unsatisfactory	17	2	2	13	1	*35

*16 very dirty.

A. WALLS AND CEILINGS

21 During the past twenty years, the biggest single factor contributing to the improvement in the working environment was the changeover during the 1950s from the use of whitewash or limewash to oil and emulsion paint. This was facilitated by the adoption of individual electric drives for the machinery. Previously limewashing, usually carried out during "Wakes Week", had been more of a disinfection than a redecoration. Whitewash often covered plant as well as walls, but even with this drastic treatment, it was not long before oil patches began to show through around each overhead bearing. The presence of overhead shafting and the multitude of driving belts tended, even with white walls and ceilings, to darken the background. With electrification and the provision of individual drives, many employers underdrew workroom ceilings with various types of millboard, thus at the same time improving the appearance and making the work of redecoration very much easier. There was one factor in favour of whitewashing – it was required to be carried out annually and was not likely to be forgotten.

22 The table (page 10) highlights the underlying improvements as well as the present-day problems very clearly. In 186 factories conditions were considered good, there being a high standard of decoration with use of colour; in 110 the decorations were reasonable, but 85 factories were classified as poor. In 42 of these wall surfaces were in reasonable decorative condition but statutory redecoration was overdue, and in 43 the walls were dirty. While the use of paint has been very beneficial there is obviously a need for more attention to the statutory 14-monthly cleaning of walls and ceilings, and more frequent and regular cleaning of floors and walls in the dirty end of the trade.

B. FLOORS

23 The 1948 report speaks of floors in some factories in the rag grinding, wool spinning and carding sections being frequently covered with grease and fibre to a depth of 1 inch or more. It is rare to find such a condition today and in the survey only 16 out of the 381 factories had really dirty floors although in a further 19 cases more attention was needed. No doubt the availability of the new detergents and various mechanical aids make cleaning easier and more effective.

TABLE III—TEMPERATURE

Rating	Heating	Opening Rag gdg. etc.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
A Factories excluding sorting and willeying							
Satisfactory		43	62	39	72	73	289
Unsatisfactory	Too warm	–	5	–	3	1	9
	Too cold	1	1	1	1	3	7
B Sorting and willeying departments and factories							
Good	General	—	—	—	—	—	48
	Local	—	—	—	—	—	23
Satisfactory	General	—	—	—	—	—	60
	Local	—	—	—	—	—	24
Unsatisfactory	Inadequate	—	—	—	—	—	8
	Not provided	—	—	—	—	—	16

24 Most of the work in wool textile factories cannot be done seated and this coupled with the fact that workers have to move about to attend to long frames or groups of machines means that the question of temperature and of ventilation is not as critical as in factories where the work is of a sedentary nature. On the other hand, in many of the earlier processes it is uneconomical to warm up the large warehouse type of buildings when there are only scattered workers engaged in sorting or willeying. The 1948 report draws attention to the problem and since then it is known that many firms have installed heating appliances. However, the problem still exists, particularly as there is a strong belief among employers engaged on commission processing that any form of heat leads to a loss of weight in the wool. From the above Table A it will be seen that generally conditions as regards temperature are reasonable, there being only 16 factories in the unsatisfactory group, 9 of which were too warm and 7 too cold. With regard to sorting and willeying factories and departments, (Table B) conditions were less satisfactory, there being 24 factories with inadequate means of heating including 16 where no heating whatsoever was provided.

25 It was also noted that the majority of mills relied on steam or hot water central heating systems with only a handful depending on gas or electricity.
Artificial humidification was introduced in 22 factories.

TABLE IV—VENTILATION

A Type of system

	Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
Natural only	99	33	25	42	66	265
Artificial only	1	—	—	—	—	1
Natural and artificial	20	35	15	34	11	115

B Effectiveness

	Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
Good	49	24	21	31	29	154
Moderate	71	43	19	43	44	220
Unsatisfactory	—	1	—	2	4	7

C Removal of fumes

	Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
Satisfactory	11	17	3	20	8	59
Unsatisfactory	7	—	—	3	1	11

26 Ventilation is probably the most difficult of all conditions to evaluate. The great majority of factories (220 out of 381) were considered to have moderately effective systems and only seven were poor. Inspectors have made the point however that they judged conditions as they found them, which would vary according to the time of day, the outside temperature etc. In the majority of factories, particularly in multi-storey mills, some additional mechanical means of ventilation which would permit the circulation of fresh air without draughts would probably be needed to satisfy the great variation in conditions which have to be met with the British climate. Against this can be set the fact that in the majority of processes there is no danger of overcrowding. At a given temperature conditions in, say, a worsted spinning mill, will always compare very favourably with those in a clothing factory where the density of workers is very much greater.

TABLE V—LIGHTING

A Level of general illumination

		Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
(1) Workrooms	Good	19	23	19	27	20	108
	Satisfactory	95	45	21	47	56	264
	Unsatisfactory	6	—	—	2	1	9
(2) Passageways	Good	19	19	14	18	8	78
	Satisfactory	96	48	26	53	68	291
	Unsatisfactory	5	1	—	5	1	12

B Type of lighting

	Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
Tungsten	21	4	4	6	12	47
Fluorescent	99	64	36	70	65	334

C Cleaning of windows

	Sorting opening rag gdg.	Worsted combing and spg.	Worsted weaving and fng.	Wool mnfr.	Misc.	Total
Good arrangements	48	29	11	15	38	141
Reasonably satisfactory	58	34	23	51	33	199
Unsatisfactory	14	5	6	10	6	41

27 Although the levels of illumination found in most factories would not have satisfied lighting experts, there is no doubt that over the past twenty years this environmental aspect has received more attention than any other. In 1948 fluorescent lighting was comparatively rare; by 1968, 334 out of 381 factories visited had installed fluorescent tubes. In 1948 it was not uncommon to find firms with their own steam raising plant with the steam engines generating their own electricity; one can recall the unscreened pendant lamps with the small blue enamel shades which were the common form of lighting. Generation was continued for several years after the war while "cuts" in the main supply were frequent; but gradually there was a changeover from steam to mains electricity and at the same time new lighting systems were introduced. The result was not only an increased level in the general illumination but an end to the shadows cast by the overhead belts and by the tungsten filament lamps.

Out of 381 factories visited the lighting was considered good in 109, satisfactory in 264, and poor in only nine.

28 Welfare amenities

The main feature disclosed by the survey was not that the welfare facilities were inadequate but that in many cases there was a poor standard of maintenance.

29 Sanitary accommodation

All the factories visited had water closets and in only five instances were they inadequate for the numbers employed. In forty-five of the 381 factories it was considered that the accommodation was poorly maintained.

30 Washing facilities

In nearly 40 per cent of the premises a higher standard of accommodation was required. The main reasons for non-compliance were:

(a) The inadequate number of wash-hasins based on a standard of one wash-hasin to every fifteen persons (35 cases);

(b) Failure to provide running hot or warm water (31 cases);

(c) The absence of soap or other cleanser (17 cases);

(d) The non-provision of towels (23 cases);

(e) The irregular renewal of clean towels (30 cases).

31 Clothing accommodation

Reliance was mainly placed on pegs in the workroom (233 cases). Separate cloakrooms were provided in ninety-nine factories, but only twelve of these had lockers, the rest had pegs. Lockers in workrooms were popular in eighty-four factories. In only two factories was there non-provision. Clearly more lockers, whether in separate cloakrooms or in suitable locations in the workrooms or passageways are needed.

32 First-aid

First-aid rooms were available in ninety-two Works and twenty of these were visited by works doctors. In addition, in sixty-one cases there were rest rooms for the use of women and girls.

33 Welfare

Welfare supervisors were employed in forty-two Works, twenty-seven being full-time appointments.

34 Canteens and meals

There is no legal requirement to provide canteens in this industry. Exactly 100 factories had a full hot meal service and eleven of these provided similar facilities throughout shifts. In 157 factories there were messrooms, leaving 124, mainly small works, without any arrangements. There was evidence that in ninety-two factories meals were taken in the workroom.

Approximately 20 per cent of the accommodation provided was inadequate, i.e. poorly lighted, ventilated, heated or furnished.

The introduction of an increasing number of vending machines particularly for hot liquids, including soups, was noted.

CHAPTER IV

PROGRESS IN ACCIDENT PREVENTION (INCLUDING THE SAFEGUARDING OF MACHINERY)

The Technical Committee and work of Specialist Inspectors

35 To implement recommendation Para. 9(5) of the 1948 report, a Technical Committee of HM Inspectors of Factories was set up to study the problems of fencing certain parts of machines, such as the working surfaces of cards and the fallers and back rollers of gill boxes for which effective methods of guarding were not known or were at the experimental stage. In addition, the Committee was to consider modifications to machine design to eliminate hazards and to report to the Joint Standing Committee. Co-operation with the cotton side of the textile industry was to be promoted through a co-ordinating committee to ensure the application of uniform standards wherever appropriate.

36 Although the Technical Committee functioned for a number of years its work has tended to devolve more and more upon:

(a) The Fencing Sub-Committees of the Wool (and Allied) Textile Employers' Council and
(b) one of HM Inspectors of Factories known as the Wool Divisional Inspector who is based in Leeds. He is Secretary to the Joint Standing Committee and is almost exclusively concerned with safety, health and welfare matters relating to the industry.

Wool divisional inspector

37 When complaints from other Inspectors are received detailing deficiencies in the guarding of new machinery, whether in relation to section 17 or other parts, the Wool Divisional Inspector visits the local makers or agents concerned to discuss ways and means of providing new guards or improving existing guards. If the makers or agents are outside the West Riding, Lancashire or Cheshire, the matters are referred to the Inspectorate's Headquarters in London.

38 The Wool Divisional Inspector prepares a Six-Monthly Analysis of Accidents for the Joint Standing Committee, and from these statistics may deduce that certain parts of machinery need to be protected, or that the standard of protection already provided needs to be improved. In consequence he may initiate action with the machinery makers or agents and with the users. Examples of this kind include the provision of guards for the squeeze rollers of backwashing machines and the provision of safeguards at punch balling machines.

39 The Wool Divisional Inspector as Secretary to the Joint Standing Committee, reports significant developments in guarding at the regular meetings of the Committee and may at the instigation of the Committee, undertake a particular line of enquiry or deal with a special hazard.

Employers Sub-Committees on Fencing

40 These Committees are sponsored by the Wool (and Allied) Textile Employers' Council and consist of nominees appointed by the Council, HM Inspectors of Factories, including the Secretary to the Joint Standing Committee, and, more recently, representatives from the Wool Industry Research Association. They are concerned with collecting and publishing information and advice on practical methods of safeguarding wool textile machinery.

41 Five committees have been formed and as a result of their work, the following booklets have been published by the Employers' Council:

(a) Guarding of Rag Grinding Machinery.
(b) Guarding of Gill Box Machinery.
(c) Safety in the use of Cloth Scouring, Milling and Wringing Machines.
(d) Guarding of Looms.

The last mentioned deals almost exclusively with methods of preventing accidental starting.

42 During the latter part of 1967 and 1968, the No. 1 Sub-Committee, which originally tackled problems connected with guarding of rag grinding machines, was reconstituted to prepare a further booklet on the guarding of opening machinery. It is hoped that this will be published during 1969.

43 No. 5 Sub-Committee wrestled with the many and complex problems of safeguarding garnetting machines but has so far not been able to solve all the technical problems involved in a conclusive and practical manner suitable for publication. A great deal of progress has, however, been made in the design and protection of garnetts, including the development of automatic fettling devices, so that it is hoped that the Sub-Committee can resume its work in the near future.

44 It is proposed that No. 2 Sub-Committee be re-convened early in 1969 to consider the guarding of worsted machinery, including punch balling machines, backwashing machines, drawing frames and worsted cards.

Accident Prevention Committees

45 An agreement was reached on 11th March 1966, between the Wool (and Allied) Textile Employers' Council and the National Association of Unions in the Textile Trade to recommend on a voluntary basis that:

(a) All wool textile factories employing 150 or more workpeople should establish an Accident Prevention Committee and
(b) all wool textile factories, whatever size, should appoint a Safety Officer, who may be part-time.

It was understood that in April 1968, 150 such Committees had been established and a half-day conference was called by the Wool (and Allied) Textile Employers' Council at the Victoria Hotel, Bradford, on 22nd May 1968, to review the function of these Committees.

Fencing of Carding Machinery

46 At the Joint Standing Committee Meeting held on 15th June 1965, it was agreed that the roller chain drive to garnett breasts at cards, which were becoming common, were dangerous and should be fenced. The question of similar drives to the workers of carding machines was referred to the Chief Inspector who decided that the Inspectorate should take steps to enforce

section 17 in relation to such drives on new carding engines. As a result, a meeting was held between the Inspectorate and the carding machinery makers on 12th April 1967, to explain the new policy and to discuss difficulties.

47 It was emphasized that the new policy would apply only to new cards, but in addition to enforcing section 17 in respect of roller chain drives to workers, the Inspectorate also intended to apply section 14 more rigorously. The only real answer to the combined problem was the provision of complete side enclosure, a policy which had already been adopted by one leading maker of worsted cards.

48 The outcome of the meeting was that an arrangement was made whereby, subject to certain exceptions in the case of some open Yorkshire sets where it was acknowledged that difficulties might arise, the carding machine makers undertook to provide side enclosure guards for all machines supplied after 1st January 1968. This decision was reported to and approved by the Committee which had just been reconstituted as the Minister's Committee, at its first meeting on 4th July 1967.

49 During 1968, a considerable number of new carding machines came into use in the industry, particularly in Scotland, and these were fitted with the new enclosure guards. Apart from minor criticisms in one or two cases, these guards were considered to be highly satisfactory. Cases of individual difficulty have been resolved by discussion between the Inspectorate and the makers concerned. It is intended to review the position from time to time, probably at Annual Meetings, and for the Secretary to report on developments at the regular Joint Standing Committee meetings.

Section 17—Fencing of new machinery

***50** This section of the 1961 Act which remains the same as that of the 1937 Act, applies to new machinery and places the responsibility for compliance not only upon the user, but also upon the supplier of the machine.

51 There is no doubt that a substantially higher standard of compliance with this section now exists than when the Joint Advisory Committee report was signed in 1948. Over the years a much greater degree of co-operation with the United Kingdom machinery makers and the agents for foreign machinery has been achieved, so that even relatively slow-moving gearing, such as take-up motion and let-off motion gearing of looms, is now generally fenced. Even now, however, not all makers and agents fully comply with their legal obligations: usually some attempt at fencing is provided, but often the guards are open on the inner or underside, or in some other ways fail to encase the gearing. The work of education and persuasion – and where necessary prosecution – must continue in order to ensure that the highest standards are achieved.

52 Co-operation with the machinery manufacturers and agents often goes far beyond minimum legal requirements and the limited scope of section 17, to afford protection for operative parts, such as the feed rollers and swifts of rag-grinding machines, the blades of cropping machines, rams of baling machines and the back rollers and fallers of gill boxes, to mention only a few examples.

**Section 17(1) requires that "in the case of any machine in a factory being a machine intended to be driven by mechanical power—*

(a) Every set screw, bolt or key on any revolving shaft, spindle, wheel or pinion shall be so sunk, encased or otherwise effectively guarded as to prevent danger: and

(b) all spur and other toothed or friction gearing, which does not require frequent adjustment while in motion, shall be completely encased unless it is so situated as to be safe as it would be if completely encased."

53 The practice of interlocking guards for gearing and other dangerous parts has increased as the Joint Advisory Committee hoped it would, though it is by no means universal. Many interlocking switches used today are of the simple limit or micro-switch type which are non-positive in their operation and fail-to-danger. The use of magnetic proximity switches of a simple type is becoming fairly common on continental machinery. While section 17 does not require interlocking, it remains a generally desirable feature and one which may be necessary if the user is adequately to discharge his obligation to fence securely under section 14(1). However, even interlocking does not overcome the problem, common on most wool textile machines, of a long run-down period, due to the inertia of the moving parts, after the power has been cut off. In some instances, time-delay devices, including captive key systems and long-threaded screws, have been successfully applied, but there appears to be a strong case for considering the incorporation of an efficient braking system into wool textile machinery at the design stage.

Progress in Fencing of Process Machinery

54 The table in Appendix 1 shows that between 1949 and 1967 there was a substantial increase in the total number of accidents reported to HM Inspectors of Factories in the United Kingdom, i.e. 172,026 to 247,058, an increase of approximately 34 per cent. The 1949 figure reflected the high war time level and by 1958 accidents had slowly reduced to 143,099. Since 1958 there had been a steady rise giving an increase of 42 per cent over the last ten years.

The wool textile industry has fortunately not followed the national trend, there being an increase of only 12 per cent in the number of accidents between 1949 and 1968. In welcoming this several special factors must be taken into account. It will be seen from Table 1 that the number employed in the wool textile industry fell from 172,210 to 115,981 during the period and this has been accompanied by the closure of a number of the less efficient businesses. On the other hand the number of immigrant workers, many of whom have had no previous experience in industry, has shown a substantial increase.

Most striking is the fall in machinery accidents in the wool textile industry from 1,042 in 1949 to 835 in 1968. Unfortunately the number of fatal accidents rose from two to five. Non-machinery accidents have risen in the same period from 1,991 to 2,633 with a corresponding fall in the number of fatal accidents from six to one.

It is of interest that the proportion of machinery accidents in the Wool Textile Industry has always been greater than that for industry in general. This was stressed in the 1948 Report of the Joint Advisory Committee at para. 43. To quote:

> "The need for improvement in the fencing of wool textile machinery is emphasised by the high percentage of machinery accidents as compared with accidents from other causes occurring in the industry. During the five most recent years for which figures are available accidents due to power driven machinery have accounted for 36 per cent of all reported Wool Textile accidents while the corresponding figure for all industry was 18 per cent."

Between 1948 and 1968 there has been a fall in the proportion of machinery accidents, i.e. from 34 per cent to 26 per cent, and although other considerations have to be taken into account such as the reduction in the amount of plant, there is no doubt that improvement in fencing standards has been a significant factor.

The table in Appendix 3 shows that guards are not being provided and in many instances not being maintained but in 1949 many of the machines referred to were not provided with guards of any sort.

Examination of the number of accidents reported at different machines shows that the main reduction has been on accidents at looms, i.e. 225 to 112, whereas those at the other major accident producing machine, the wool card, have remained roughly the same, 167 in 1949 and 164 in 1968. In contrast worsted card accidents have fallen from 68 to 39. This latter probably reflects the great number of closures on the worsted side of the industry but it may also owe something to the panel types guards used at the new worsted cards.

Surprisingly accidents at spinning frames have risen from 65 to 80 despite the very great improvement in standards of guarding. As many accidents arise from the removal of laps this rise reflects the increased use of the stronger synthetic yarns compared with pure wool.

The table in Appendix 3 shows the standard of fencing provided for certain classes of wool textile machinery. It was compiled from information obtained by HM Inspectors of Factories during the survey carried out in the West Riding during the first eight months of 1968. The figures do not represent a carefully chosen statistically accurate sample but they are considered accurate enough to highlight these parts of the machinery which require priority attention:

55 **Transmission machinery:** especially vee belt drives to many classes of machines, and auxiliary drives forming parts of machines themselves, e.g. the swift-to-swift drives at woollen scribblers and carders.

56 **Lickers-in and adjacent rollers of woollen scribblers and carders:** the table shows that of the 547 machines seen, 75 had no guards whatever for these parts, and 135 had guards which were considered unsatisfactory.

57 **Gearing:** too many machines were seen without any guards for certain trains of gears and at many machines the guards provided for gearing were unsatisfactory in that they failed to enclose the gearing completely.

58 **Feed rollers and swifts of rag grinders and willeys:** while substantial progress has clearly been made, far too many machines of both classes were seen, either with no guards to prevent access to the feed rollers and swifts at the feed end of the machine (particularly in the case of willeys) or where guards were provided they were inadequate.

59 **Back rollers and fallers of gill boxes:** guards for these had not been developed at the time when the 1948 report was issued so that all the progress made has been since that date. Nevertheless, of the 1,263 machines surveyed, 59 had no guards and 277 had guards which did not afford secure fencing.

60 **The projections on the beaming-off motion of warping mills:** nearly one quarter of the machines surveyed still had unprotected projections at the beaming-off motion; occupiers and others have been slow to appreciate the serious risk which these machines present and the consequent need for fencing these dangerous parts.

61 **Trap between the pressure or weight bar and the mandrel at punch balling machines:** 54 out of a total of 68 machines surveyed had either no guarding at all or inadequate protection for this trap.

62 **Squeeze rollers of backwashing machines:** the provision of fencing for the squeeze rollers of these machines has only been pressed for during the past six or seven years and, initially, there were difficulties in providing suitable guards, but modern fixed guards in stainless steel, either of the "letter box" type, or of bars in the form of a vertical "cattle grid" can be fitted to machines of all types. Occupiers have been slow to accept the need for guarding these rollers and over 50 per cent of the machines seen were still unfenced.

CHAPTER V

SPACING

63 The most important and urgent matter considered by the Joint Advisory Committee during its deliberations between 1945 and 1948 was the problem of the overcrowding of machinery. The end of the war presented a unique opportunity, because during hostilities, many mills had been taken over for storage or for other manufacturing processes; on the other hand, in 1945 there were available a limited number of newly built factories which were no longer required for ordnance purposes. The committee, recognising the urgency of the problem, brought out two interim reports laying down standards for the spacing of machinery prior to the publication of its main report.

64 Despite the great progress made during the last twenty years in reducing the amount of overcrowded machinery, the general observations of the committee on the advantages of good spacing are still relevant.

> "It is the unanimous view of this committee that the machinery in many mills is seriously overcrowded and that generally speaking a greatly improved standard of spacing is long overdue. We have not thought it necessary, however, to consider the spacing of every class of machine in the trade and have confined our discussions to those in which overcrowding is prevalent. Despite this limitation our recommendations are necessarily of a rather complicated nature in order to cover the varieties of process and lay-out which are characteristic of the industry.
>
> The Factories Act 1937 does not deal directly with spacing except in section 19 which specifies minimum standards for self-acting machines, including spinning mules. Though the legal standards have limited application the importance of good spacing of machinery is now widely recognised; a well-spaced plant has many obvious advantages, one of the most important being increased ease in the movement of heavy or bulky goods. In weaving sheds particularly, much unnecessary fatigue and strain are caused by the manipulation of heavy warp beams in narrow spaces, and in the discussions on spacing of looms, we have had continually in mind the desirability of the spacing being such that a beam can be easily manipulated at the back of every loom. In discussing carding machines we have considered not only the spacing at the sides of the machines necessary to ensure reasonable safety of persons passing or working, but also the spacing at the ends which is required to ensure ease of access and work for persons engaged in the manipulation of bulk materials. There is also no doubt that a more generous spacing of the steam-heated cards in woolcombing mills would contribute towards a reduction of the excessive temperatures often found in such factories."

65 The committee laid down spacing standards for five categories of machinery; carding machines, both worsted and woollen, worsted drawing machinery, spinning and twisting frames, mules and looms. Realistically lower standards were accepted where reorganisation of machinery was to be carried out in existing rooms. It was hopefully suggested that relying on voluntary co-operation, the backbone of the problem could be broken within five years. The whole matter was to be reviewed at the end of this period.

66 It was anticipated that there would be difficulties in some cases in reaching the standards recommended and it was agreed that such cases should be referred to the proposed Joint Standing Committee. In fact, a separate Joint Standing Committee was set up to deal with spacing problems in Scotland, and to handle the many cases referred to the main committee separate sub-committees for different classes of machines were appointed.

67 Following a survey of all wool textile factories carried out by HM Factory Inspectorate in 1953, the Joint Standing Committee produced its First Report which amended in the light of experience the existing standards. These are still current and are reproduced in Appendix 4 of the Report. The Committee was unanimous that a further period should be allowed for compliance to be secured on a voluntary basis.

68 In December 1964 it was agreed that a survey should be carried out to check if the voluntary effort was achieving sufficient success. Initially a 10 per cent sample of mills in the West Riding was surveyed and in those cases where machines were shown to be spaced at below 50 per cent of the recommended standard, a visit of the appropriate sub-committee was arranged. At the meeting of the Joint Standing Committee on the 5th July 1966 it was agreed that the rest of the mills should be visited, but in view of the burden of work involved the survey was restricted to worsted and woollen cards and looms in West Riding mills which were known to have these machines spaced at below 50 per cent of the recommended minimum standard.

69 Records of the 1953 survey showed that some 420 firms had 1,110 carding machines and 9,138 looms spaced at below 50 per cent of the recommended minimum standard for these machines. The latest survey showed that only 249 of these mills were still in production in 1966/67. In these mills 216 carding machines and 641 looms were still below 50 per cent of the recommended minimum standard. Clearly, the elimination of old and uneconomic mills had been the major factor in bringing about this substantial improvement. In addition, many old looms had been replaced by modern machines which required a completely new layout with adequate space. Inevitably, carding machines presented a greater problem, although improvements had been achieved by scrapping machines and, in some cases, by the use of narrower belting.

70 Much of the Joint Standing Committee's work has been taken up in visiting and discussing problems at mills where there were proposals to respace or at mills which had respaced but had not achieved the recommended standard. In contrast the 1966 survey was concerned with mills which had, according to the records had spacing standards, and had done nothing to improve them. During 1968 two sub-committees dealing with carding machines and looms visited the worst of these factories. Of the twenty visits paid twelve were to weaving sheds and apart from one case a satisfactory solution was found. The problems were much less tractable in the eight carding rooms, but with the willing co-operation of all the occupiers a substantial measure of success was achieved.

This augurs well for the continuation of the voluntary effort and the Committee proposes to pursue these visits to premises known to be below standard for a further period of five years after which it suggests the whole question of Spacing should be once again reveiwed.

CHAPTER VI

RECOMMENDATIONS AND CONCLUSIONS

71 **Recommendations.** The Committee feel that despite the substantial progress that has been made in improving working conditions in many wool textile factories since the Report of 1948 was signed, the survey carried out by HM Inspectors of Factories in 1968 revealed that in some factories conditions are still unsatisfactory in certain important respects. They wish therefore out of the detailed recommendations made in the 1948 report to draw attention to the following:

Environmental factors

(a) *Cleanliness of walls and ceilings*

More attention should be paid to the statutory 14-monthly cleaning down of painted surfaces, and to more frequent regular cleaning in factories at the dirty end of the trade. (Para. 22).

(b) *Temperature*

The provision of adequate local heating for workers scattered in the large warehouse type of building, e.g. on sorting, is required. (Para. 24).

(c) *Ventilation*

Additional mechanical means of ventilation is needed in a number of factories to secure the circulation of fresh air without causing draughts. (Para. 26).

Welfare amenities

(d) *Sanitary accommodation*

There is an urgent need for more regular cleaning of conveniences. (Para. 29).

(e) *Washing facilities*

In nearly 40 per cent of the factories a higher standard is needed. In 35 factories more wash-basins are required to achieve a standard of one basin to 15 persons; running hot or warm water is still not provided in 31 factories; and soap and clean towels in 70 factories. (Para. 30).

(f) *Clothing accommodation*

The provision of more lockers, either in separate cloakrooms or in suitable parts of work-rooms or passageways is recommended. (Para. 31).

Safety

(g) *New machinery – fencing*

(i) *General.* The Committee welcomed the close liaison between the Wool Divisional Inspector and the machinery makers and trusts that in future no machines will be supplied which do not conform with the full provisions of the Factories Act. (Paras. 31–39 and 51–56).

(ii) *Fencing of carding machines.* The Committee has noted the approach to the carding machine manufacturers and hopes this will be the forerunner of similar arrangements. (Paras. 46–49).

(h) *Fencing of machines with special problems – employers' sub-committees*

It is hoped that the work of the Wool (and Allied) Textile Employers' Council Sub-Committees will be continued and speeded up and that satisfactory solutions will be found to the difficult problems of secure fencing of carding and garnetting machines. (Paras. 40–44).

(i) *Fencing: machines at which special attention is required*

The survey highlighted the following:

(i) Transmission machinery, especially vee belt drives. (Para. 55).
(ii) Lickers-in and adjacent rollers at woollen scribblers and carders. (Para. 56).
(iii) Swift-to-swift drives at cards. (Para. 55).
(iv) Feed rollers and swifts of rag-grinders and other opening machines. (Para. 58).
(v) Back rollers and fallers of gill boxes. (Para. 59).

(vi) Projections on the beaming-off motion of warping mills. (Para. 60).
(vii) Trap between the pressure bar and mandrel of punch balling machines. (Para. 61).
(viii) Squeeze rollers of backwashing machines. (Para. 62).
(ix) Machine gearing generally. (Para. 57).

(j) *Maintenance of guards*

A glance at Appendix 3 will show that there were far more machines with guards which did not provide secure fencing than there were machines with no guards at all. This clearly points to low standards of maintenance, and the Committee would urge that regular checks are carried out to ensure that the safeguards provided are used and maintained.

(k) *Safety officers and safety committees*

A Safety Officer, full or part-time, should be appointed in every factory, and in the larger works there should also be a Safety Commitee. (Para. 45).

Spacing

(l) The committee wishes to reiterate the importance of the spacing of machinery to the recommended standards. It proposes that the voluntary efforts of occupiers should be allowed to continue for a further period of five years after which the position should be once again reviewed. (Paras. 63–70 and Appendix 4).

72 Conclusions. The preparation of this report has not been preceded by the exhaustive enquiries such as those undertaken by the Joint Factory Advisory Committee which reported in 1948. Rather, it has been an attempt by the newly appointed Joint Standing Committee to take stock of the present standards of safety, health and welfare provisions in the wool textile industry.

As explained in the Foreword (Para. 8), it was felt that re-publication of the recommendations of the 1948 Report with re-emphasis on those recommendations which required most urgent attention would help provide the necessary publicity to ensure that the attention of the Industry was directed towards the necessary improvements in working conditions.

(Signed) J. A. DAVIS (*Chairman*)
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9th April 1969

APPENDIX 1

National and Wool Textile Industry Accident Statistics

Year	Wool textile industry				National accident total (Factories)
	Nos. employed	Accidents			
		Non-machinery	Machinery	Total	
1949	172,210	1,991 (6)	1,042 (2)	3,033 (8)	172,026
1953	174,016	1,997 (2)	996 (3)	2,993 (5)	158,597
1958	152,842	1,579 (1)	673 (3)	2,252 (4)	143,099
1963	145,073	1,928 (3)	781	2,709 (3)	168,106
1964	137,935	2,298 (3)	966 (3)	3,264 (6)	217,950
1965	133,233	2,533 (1)	1,065 (3)	3,598 (4)	239,158
1966	125,305	2,574 (3)	920 (1)	3,494 (4)	241,051
1967	115,981	2,455	869 (4)	3,324 (4)	247,058
1968	114,684	2,633 (1)	835 (5)	3,468 (6)	254,474

NB Fatal accidents shown in brackets.

APPENDIX 2

Wool Textile Industry Accidents Classified According to Causation

Cause	1949	1953	1958	1963	1968
*Prime movers and transmission machinery	18 (1)	4 (1)	7 (1)	1	1
Hoists and lifting machinery	24	27	14	15	16
Other non-textile machinery	36	28	25 (1)	16	22
Rag grinding	6	13	5	5	5

cont.

Appendix II—*cont.*

Cause	1949	1953	1958	1963	1968
Opening	23	17	13	10	18 (1)
Garnetts	4	17	9	16	19
Wash bowls	14	7	5	9	9
Worsted cards	68 (1)	54	37	48	39
Wool cards	167	162 (1)	102	144	164 (1)
Combs	31	11	11	32	17
Punch balling	4	12	4	5	4
Gill box	64	107	49	41	35
Drawing and roving frames	63	48	40	41	40
Spinning frames	65	74	44	64	80
Mules	56	51	32 (1)	31	21
Twisting	38	29	44	44	52
Winding	38	38	32	43	33
Warping and beaming	16	14	5	12	14 (1)
Looms	225	197 (1)	134	136	112 (1)
Washing and scouring	11	15	10	6	8 (1)
Milling	11	11	4	8	4
Wringing	5	1	1	3	—
Blowing	3	5	4	2	1
Cropping	2	3	3	2	—
Other textile machines	50	51	39	47	121
Total machinery	1,042 (2)	996 (3)	673 (3)	781	835 (5)
Non-machinery	1,991 (6)	1,997 (2)	1,579 (1)	1,928 (3)	2,663 (1)
Grand total	3,033 (8)	2,993 (5)	2,252 (4)	2,709 (3)	3,468 (6)

NB Fatal accidents shown in brackets.

*Other than machine belts and pulleys.

APPENDIX 3

Standard of Fencing of Process Machinery at 1968 Survey

Machine (1)	Dangerous part (2)	Satisfactory guard provided (3)	Guard provided but n.s.f. (4)	No guard (5)
1 Rag grinder No. 184	(a) Feed rollers and swift	77	93	14
	(b) Back of swift (thro' bit box opening)	58	84	42
	(c) Machine belts and pulleys	138	27	19
	(d) Feed roller gears	172	10	2
	(e) Chain drive to feed rollers	173	4	1
2 Opening m/cs. (willeys, shakers, teasers, fearnoughts etc.) No. 219	(a) Feed rollers and swift	94	69	56
	(b) "Fan" or delivery roller	149	19	2
	(c) Machine belts and pulleys	161	39	19
	(d) Gearing	172	33	14
3 Woollen scribbling and carding m/cs No. 547	(a) Main drive	483	20	44
	(b) Swift to swift drives	455	11	81
	(c) Lickers-in and adjacent rollers	337	135	75
	(d) Open spoked ps. and gear wheels	487	2	58
	(e) Condenser gearing	371	154	22
	(f) Other gearing	397	91	31
	(g) Roller chain drives to Garnett breasts, workers etc.	34	4	49
4 Worsted cards No. 261	(a) Main drive	255	6	—
	(b) Swift to swift drs.	244	2	15
	(c) Dr. to 3rd licker	188	4	35
	(d) Open spoked ps. and gear wheels	234	3	24
	(e) Gearing roller	207	21	33
	(f) Roller chain drs. to Garnett breasts, workers etc.	27	2	73

Machine (1)	Dangerous part (2)	Satisfactory guard provided (3)	Guard provided but n.s.f. (4)	No guard (5)
5 Gill boxes, (all types) No. 1263	(a) Back rollers	927	277	59
	(b) Fallers	927	277	59
6 Worsted drawing and roving No. 1254	(a) Headstocks (jack boxes) of cone roving m/cs.	287	1	—
	(b) Porcupine rollers of French drawing m/cs.	20	—	—
	(c) Gearing	1,147	100	7
7 Mules No. 473	(a) Headstocks	374	46	53
	(b) Rimband, drawband and other pulleys	456	6	11
	(c) Carriage wheels	440	3	30
	(d) Faller stops	430	8	35
	(e) End gearing driving surface drums	437	20	16
8 Spinning and twisting frames No. 2436	(a) Gearing	2,246	145	45
	(b) Chain drive to twist motion	1,904	54	14
9 Winding m/cs. No. 568	(a) Machine shafts	511	5	11
	(b) Gearing	513	46	9
10 Beaming and warping No. 336	(a) Projections in beaming-off motion	261	16	59
	(b) Gearing	237	31	68
11 Looms No. 4750	(a) Main gearing	3,444	575	731
	(b) Dobby gearing	2,563	43	751
	(c) Tappet gearing	1,383	25	253
	(d) Dobby shaft	2,992	—	119
	(e) Shuttle	3,908	475	33
12 Punch balling m/cs. No. 68	(a) Trap between mandrel and pressure bar	14	29	25
	(b) Trap between mandrel and side plate (if mandrel is power operated)	14	—	3

Machine (1)	Dangerous part (2)	Satis-factory guard provided (3)	Guard provided but n.s.f. (4)	No. guard (5)
13 Cloth scouring m/cs. No. 188	Squeeze rollers	149	33	6
14 Cloth milling m/cs. No. 272	(a) Squeeze rollers	264	6	2
	(b) Chain and sprocket drives	248	10	14
15 Wringing m/cs. (Including No. 39 tandem and lecker m/cs.)	Squeeze rollers	25	10	4
16 Yarn hank scouring m/cs. No. 4	(a) Squeeze rollers	2	—	2
	(b) Gearing	4	—	—
	(c) M'c belts and pulleys	4	—	—
17 Cropping m/cs. No. 80	(a) Knife cylinders	73	7	—
	(b) Gearing	73	4	3
	(c) M'/c. drives	65	11	4
18 Blowing m/cs. No. 41	(a) Intake between cloth or wrapper and roller	29	12	—
	(b) Gearing	40	1	—
	(c) M'/c drives (including dr. to pump)	36	5	—
19 Backwashing m/cs. No. 60	Squeeze rollers	13	14	33

NB Owing to wide variations within a particular class of machine, the sum total of the figures given in columns (3) (4) and (5) will not necessarily balance with column 1.

APPENDIX 4

This Appendix contains the spacing standards recommended by the Joint Advisory Committee as amended by the Joint Standing Committee. These standards vary according to whether the machinery is in new or in existing buildings and the division is as follows:

CATEGORY "A"

Installation of plant in new buildings. ("New buildings" means buildings erected or acquired after 1949 and includes existing buildings taken into use for the first time as textile factories.)

CATEGORY "B"

New or reorganised installations in existing rooms.

The mere replacement of a machine by a new one of a similar type is not regarded as a new installation unless it is one of a series of replacements, but any rearrangement of machinery is considered to be a reorganisation.

For certain machines the category is sub-divided into:

(a) installation of new machinery in existing rooms;

or

(b) reorganisation of existing machinery in existing rooms; also the installation of existing machinery in fresh premises (other than new buildings as defined in Category "A") where the B(a) standards cannot reasonably be attained.

Tables of the Minimum Dimensions Recommended for the Spacing of Wool Textile Machinery

CARDING MACHINES

Category	Sides of woollen and worsted cards (Between nearest moving parts of two cards or between card and wall) (1)	Main gangways in woollen card rooms (u) (2)		Worsted cards (3)		
		(a) Between two cards or card and wall	(b) Between cards and mules	(a) Main gangway	(b) Space at feed or delivery end	(c) Between delivery ends of two rows of cards
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
A	3 6	7 6	7 6	8 0	5 0	8 0
B (v)	2 6	6 6 (x) (w)	6 6 (x) (y) (w)	7 0 (between 2 cards) 6 0 (card to wall)	3 6	(z)

Notes:

(u) The expression "Main Gangway" means any gangway at the sides or ends of woollen cards along which there is conveyance of materials other than conveyance by fan through overhead ducting.

(v) Where there is difficulty in reaching the category B standards the Joint Standing Committee may be consulted.

(w) Where the gangway is used only for the passage of condenser bobbins, 6 ft. may be accepted.

(x) Except where the lay-out of cards does not permit, in which case 6 ft. may be accepted.

(y) Provided that where condenser bobbins are stored in this space this measurement shall be 7 ft. 6 in. (or where the lay-out of cards does not permit, 7 ft.).

(z) No special recommendation was made.

WORSTED DRAWING MACHINERY

Category	Main gangways (1)	Gill and drawing boxes (2)			Reducing and roving frames (3)		
		(a) Fronts (Between spindles)	(b) Backs	(c) Sides	(a) Fronts (Between spindles)	(b) Backs	(c) Sides
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
A	6 0	3 0	3 0 (z)	3 0 (x)	3 6	2 0 (z)	3 0 (x)
B (i)	5 0	3 0	2 0 (z)	2 6 (x)	3 6	2 0 (z)	2 6 (x)
B (ii)	5 0 (y)	3 0	2 0 (z)	2 6 (y) (x)	3 0	1 6 (z)	2 6 (x) (y)

Notes:

Overhead, vertical, or other creels and cans in use are to be regarded as part of the machine.

(x) This provision shall not be interpreted as requiring a gangway between machine and wall or between adjacent machines which are not more than 6 in. apart, provided that any reducing or roving frames placed side to side without intervening gangways shall not have between them a total of more than 48 spindles.

(y) Where there is difficulty in reaching these standards the Joint Standing Committee should be consulted.

(z) In the case of machines with overhead creels, or with detached vertical creels of the type where creeling is done between the creel and the machine, this provision shall not be interpreted as requiring a clear space between creel and wall where machines are placed with their backs to a wall or between two creels where machines are placed back to back, provided there is no main gangway at the backs of the machines.

SPINNING AND TWISTING FRAMES

Category	Main Gangway (1)	Spinners' and Twisters' Gate (Between spindle centres) (2)	
		(a) Without self-doffers	(b) With self-doffers
	ft. in.	in. ft.	ft. in.
A	6 0	3 6	4 0
B (i)	5 0	3 6	4 0
B (ii)	5 0(y)	3 0	3 6

Note:

(y) Where there is difficulty in reaching this standard the Joint Standing Committee should be consulted and if the width of the main gangway is considered inadequate, a suitable provision should be made for skeps to be kept elsewhere than in the alley.

Category	Main gangway (across the ends of mules) (1)		Subsidiary gangways (between mule and wall) (2)	Mulegate (between headstock of one mule and faller bar of the next) (3)		Backs of mules (4)	
	(a) Between two lines of mules	(b) Between a single line of mules and a wall				(a) Woollen mules (between two mules or between mule and wall measured from the boards supporting the tin rollers)	(b) Worsted mules (between two mules or between mule and wall measured from the backs of the roller beams)
A	ft. in. 8 0	ft. in. 6 0	ft. in. 2 0 (w)	ft. in. 2 0		ft. in. 3 0	ft. in. 3 0
B	6 6 (y)	6 0	2 0 (w) (z)	(a) Mills built since 1895	(b) Mills built before 1896	2 6 (x)	3 0
				ft. in. 2 0	ft. in. 1 9		

Notes:

(1) In no case should a carriage or carriage wheel approach within 18 in. of a pillar or wall.

(2) Difficulties may be expected in reaching the category B standards where existing mules are re-spaced in existing buildings, and in respect of measurement (4) where new mules are installed in buildings erected before 1896. In such cases the Joint Standing Committee should be consulted and the possibility of alternative safety measures considered by them.

(w) This shall not be interpreted as requiring the provision of a subsidiary gangway but where there is such a gangway it shall not be less than 2 ft. wide.

(x) Where creeling (other than creeling with condenser bobbins) is done at the back of a mule this measurement should not be less than 3 ft.

(y) Provided that the Joint Standing Committee may have power to reduce this measurement to 6 ft. where the additional 6 in. would involve the elimination of a standard bobbin.

(z) Cases where this spacing would involve the elimination of a standard bobbin may be referred to the Joint Standing Committee.

Category	Backs of looms (between beam flanges) (1)	Gangways (2)		Weavers' alleys (between breast beams) (3)	
		(a) Main gangways (any gangway between the ends of looms used for the passage of beams)	(b) Subsidiary gangways (not used for the passage of beams)	(a) Where only one weaver works in the alley	(b) Where more than one weaver works in the alley
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
A	3 6	6 6	3 0	2 0	2 6
B	(x)	5 6	2 0	1 9	2 0

Notes:

The above table is intended to apply to looms arranged in the usual manner, face to face and back to back. Occasionally, however, all looms in a room face in the same direction, i.e. the weaver works between the breast beam of one loom and the warp beam of the next. Where looms are arranged in this manner, we consider that the width of the weaver's alley should be 2 ft. 6 in. for category A looms and 2 ft. 3 in. for category B looms, measured between the breast beam of one loom and the beam flanges of the next.

(x) Backs of Looms (category B): the space between beam flanges shall be equal to the diameter of the beam flange plus 6 in., provided that:

(a) In no case shall the clear space between flanges be less than 20 in.

(b) Where the diameter of the beam flanges exceeds 26 in., for the above reference to 6 in. there shall be substituted 9 in.

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by J. Looker Ltd., Poole, Dorset

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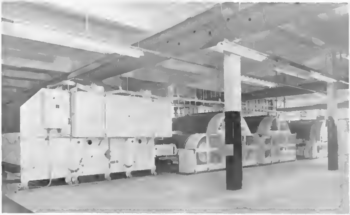

Fig. 1. A modern woollen carding machine.

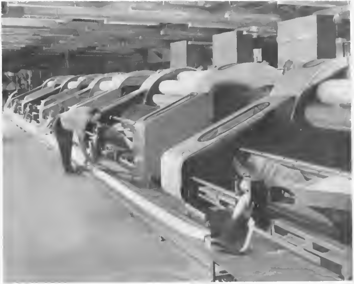

Fig. 2. A modern worsted carding machine.

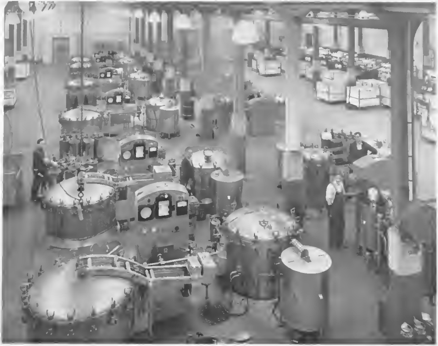

Fig. 3. A modern dyehouse.

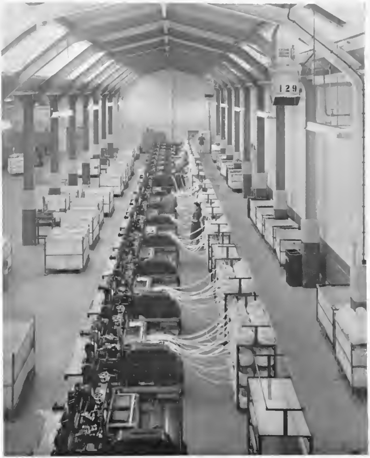

Fig. 4. A new re-gilling section.

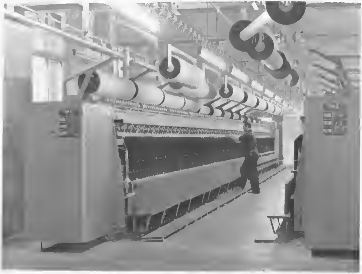

Fig. 5. New woollen ring spinning frames.

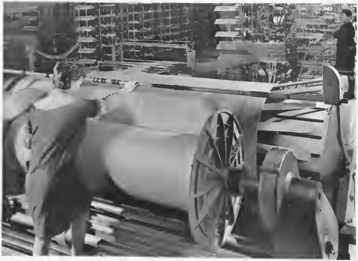

Fig. 6. A new warp beaming plant.